UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/621,447	07/18/2003	Yong-Sik Kwon	Q75898	1114

23373 7590 04/04/2007

SUGHRUE MION, PLLC
2100 PENNSYLVANIA AVENUE, N.W.
SUITE 800
WASHINGTON, DC 20037

EXAMINER	
MALEK, LEILA	
ART UNIT	PAPER NUMBER
2611	

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	04/04/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary	Application No.	Applicant(s)	
	10/621,447	KWON ET AL.	
	Examiner	Art Unit	
	Leila Malek	2611	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *16 January 2007*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-16* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,7-9,15 and 16* is/are rejected.

7)☒ Claim(s) *2-6 and 10-14* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *18 July 2003* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Response to Arguments

1. Applicant's arguments, see Remarks, pages 10-12, filed on 01/18/2007, with respect to the U.S.C. § 103 rejection of claims 1 and 9 have been fully considered and are persuasive. Therefore, the rejection has been withdrawn. However, upon further consideration, a new ground(s) of rejection is made.

Claim Objections

2. Claims 1, 2, 5, 9, 10, and 13 are objected to because of the following informalities: Regarding to the above-mentioned claims, Applicant has changed the "second received signal" to "third received signal" and vice versa. However the claims status identifiers (e.g. original or currently amended) show that the claims are still in their original forms. Appropriate correction is required.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. Claims 1, 7-9, 15 and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over applicants admitted prior art (background of invention) and Fujii (US 2002/0181557), further in view of Lilleberg et al. (hereafter, referred as Lilleberg) (US 5,905,946).

As to claims 1 and 9, applicant's admitted prior art discloses a channel estimation apparatus (see page 2, paragraph 04) in a digital communication system comprising: a correlation unit 111 for obtaining a correlation function of a first received signal by means of a correlation between a received synchronizing signal (i.e. the PN sequence) and a reference synchronizing signal (i.e. the reference PN sequence), and obtaining a correlation function of the received synchronizing signal by means of a correlation between the synchronizing signals; a first estimating unit 113 for estimating a first multi-path by applying a first threshold value to the correlation function of the first received signal. Applicant in the background of invention discloses all the subject matters claimed in claims 1 and 9, except a correlation noise removing unit for obtaining a correlation function of a second received signal by removing correlation noise included in the correlation function of the first received signal, by means of the first multi-path and a second estimating unit for estimating a second multi-path by applying a second threshold value to the correlation function of the second received signal in which the correlation noise has been removed. Fujii discloses a communication apparatus comprising a channel estimation section 102 (see paragraph 0025 and Fig. 3), which calculates a channel estimation value by calculating the correlation between a basic code and the midamble (i.e. a pilot symbol, see paragraph 0019) of receiving baseband signal. Fujii further discloses (see paragraph 0031) a JD demodulating section 108 which generates a matrix by predetermined processing using the channel estimation value of the path selected by path selection 107 of the corresponding user selected by user determining section 104, and executes demodulation to obtain the desired

receiving data while canceling the interference (interpreted as correlation noise). It would have been obvious to one of ordinary skill in the art at the time of invention to modify the applicants admitted prior art to use a correlation noise removing unit as suggested by Fujii to avoid performance deterioration in the system (see the abstract and paragraphs 0039-0040). Applicant's background of invention and Fujii disclose all the subject matters claimed in claims 1 and 9, except having a second estimating unit for estimating a second multi-path by applying a second threshold value to the correlation function of the second received signal in which the correlation noise has been removed. Lilleberg discloses a method for estimating a channel in a receiver, wherein the receiver comprising means for subjecting the received signal to elimination of multiple-access interface (interpreted as correlation noise; see column 1, paragraph 6) (See the abstract and column 2, lines 15-33). Lilleberg further shows (see Fig. 2) that the receiver comprises first estimation means 20 whose transmission is a received and digitized signal and where the preliminary channel estimation is conducted by a known estimation method. Lilleberg also discloses that the receiver of invention comprises: means 22 for eliminating interference (i.e. the correlation noise) from the received signal by a known interference elimination method, and means 23, in which channel parameters of the interference-free (interpreted as correlation noise-free) signal are estimated, whereby more accurate estimates are obtained than in the first estimation means, which conducts the preliminary estimation (see column 3, lines 20-39). Lilleberg is silent in disclosing that the estimation has been performed by applying a second threshold to the correlation function. However it is well known from the primary

reference that the estimation might be performed using this method. It would have been obvious to one of ordinary skill in the art at the time of invention to modify Applicant's background of invention and Fujii to use two estimators in the system to increase the accuracy of estimation as suggested By Lilleberg (see column 2, paragraph 6 and column 3, second paragraph).

As to claims 7 and 15, Fujii discloses (see paragraph 0031) that the JD demodulating section 108 generates a matrix using the channel estimation value of the path selected by path selection 107 (interpreted as the first multi-path) of the corresponding user selected by used determining section 104, and executes demodulation to obtain the desired receiving data while canceling the interference (interpreted as correlation noise). It would have been obvious to one of ordinary skill in the art at the time of invention to modify the applicants admitted prior art and Lilleberg as suggested by Fujii to avoid performance deterioration in the system (see the abstract and paragraphs 0039-0040).

As to claims 8 and 16, applicant's admitted prior art discloses that the reference synchronizing signal is a PN sequence (see page 2, paragraph 04).

Allowable Subject Matter

4. Claim 2-6 and 10-14 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Conclusion

5. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure (US 2004/0017843).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Leila Malek whose telephone number is 571-272-8731. The examiner can normally be reached on 9AM-5:30PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mohammad Ghayour can be reached on 571-272-3021. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Leila Malek
Examiner
Art Unit 2611

L.M

MOHAMMED GHAYOUR
SUPERVISORY PATENT EXAMINER